SAFETY DATA SHEET according to the OSHA Hazard Communication Standard

Version 8.4
Revision Date 05/08/2026
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SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : LSMLS Plate 2 (Water Soluble)

Product Number : LSMLS02
Brand : Sigma

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards for the product as supplied

Acute toxicity (Oral) : Category 4

Acute toxicity (Inhalation) : Category 2

Skin irritation : Category 2

Serious eye damage : Category 1

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Respiratory sensitisation	:	Category 1
Skin sensitisation	:	Category 1
Germ cell mutagenicity	:	Category 2
Reproductive toxicity	:	Category 1B
Specific target organ toxicity - repeated exposure	:	Category 2 (thymus)

Other hazards

None known.

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements :
H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H330 Fatal if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341 Suspected of causing genetic defects.
H360 May damage fertility or the unborn child.
H373 May cause damage to organs (thymus) through prolonged or repeated exposure.

Supplemental Hazard Statements : Corrosive to the respiratory tract.

Precautionary statements :

Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye

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protection/ face protection.
P284 Wear respiratory protection.

Response:

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of water.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Additional Labelling

The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: 100 %
The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 100 %

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

CAS-No. : Not Assigned

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
Guanidine, N-methyl	471-29-4*	>= 0.5 - <= 1.5	TSC
4-ACETAMIDOBUTYRIC ACID	3025-96-5*	>= 0.5 - <= 1.5	TSC
pyridine-2-carboxylic	98-98-6*	>= 0.5 - <= 1.5	TSC

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acid			
pidolic acid	98-79-3*	>= 0.5 - <= 1.5	TSC
2-Hydroxy-2-methylpropionic acid	594-61-6*	>= 0.5 - <= 1.5	TSC
3,3'-iminodi(propylamine)	56-18-8*	>= 0.5 - <= 1.5	TSC
3-Nitropropionic acid	504-88-1*	>= 0.5 - <= 1.5	TSC
L-Pipecolic acid	3105-95-1*	>= 0.5 - <= 1.5	TSC
Triox	1184-78-7*	>= 0.5 - <= 1.5	TSC
1,3-diaminopropane	109-76-2*	>= 0.5 - <= 1.5	TSC
succinic acid anhydride	108-30-5*	>= 0.5 - <= 1.5	TSC
Nicotinamide hypoxanthinedinucleotide sodium salt	104809-38-3*	>= 0.5 - <= 1.5	TSC
L-4-hydroxyproline	51-35-4*	>= 0.5 - <= 1.5	TSC
O-Phosphoserine	407-41-0*	>= 0.5 - <= 1.5	TSC
dopamine hydrochloride	62-31-7*	>= 0.5 - <= 1.5	TSC
L-Cysteinesulfinic Acid Monohydrate	207121-48-0*	>= 0.5 - <= 1.5	TSC
pyridine-2,3-dicarboxylic acid	89-00-9*	>= 0.5 - <= 1.5	TSC
3-Hydroxy-5-(hydroxymethyl)-2-methylisonicotinic acid	82-82-6*	>= 0.5 - <= 1.5	TSC
Theophylline	58-55-9*	>= 0.5 - <= 1.5	TSC
2,6-Diaminopimelic acid	583-93-7*	>= 0.5 - <= 1.5	TSC
2-Aminoadipic acid	542-32-5*	>= 0.5 - <= 1.5	TSC
(-)-Norepinephrine	51-41-2*	>= 0.5 - <= 1.5	TSC
2,5-Dihydroxybenzoic acid	490-79-9*	>= 0.5 - <= 1.5	TSC
(2-Aminoethyl)phosphonic acid	2041-14-7*	>= 0.5 - <= 1.5	TSC
(-)-Tartaric acid	147-71-7*	>= 0.5 - <= 1.5	TSC
3,7-Dihydro-1,7-dimethyl-1H-purine-2,6-	611-59-6*	>= 0.5 - <= 1.5	TSC

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dione			
3-Dehydroshikimic acid	2922-42-1*	>= 0.5 - <= 1.5	TSC
1,2,3,4-Butanetetrol	2418-52-2*	>= 0.5 - <= 1.5	TSC
Trehalose	99-20-7*	>= 0.5 - <= 1.5	TSC
Caffeine	58-08-2*	>= 0.5 - <= 1.5	TSC

* Indicates that the identifier is a CAS No.
TSC- the actual concentration or concentration range is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice : Consult a physician.
Show this safety data sheet to the doctor in attendance.
Move out of dangerous area.

First aiders need to protect themselves.
Show this safety data sheet to the doctor in attendance.

If inhaled : If breathed in, move person into fresh air.
If not breathing, give artificial respiration.
Consult a physician.

After inhalation: fresh air. Immediately call in physician.
If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off with soap and plenty of water.
Take victim immediately to hospital.
Consult a physician.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.
Consult a physician.

In case of eye contact : Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Continue rinsing eyes during transport to hospital.

After eye contact: rinse out with plenty of water.
Immediately call in ophthalmologist.
Remove contact lenses.

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If swallowed	:	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician. After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.
Most important symptoms and effects, both acute and delayed	:	The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11
Protection of first-aiders	:	For personal protection see section 8.
Notes to physician	:	No data available

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Water Foam Carbon dioxide (CO2) Dry powder
Unsuitable extinguishing media	:	For this substance/mixture no limitations of extinguishing agents are given.
Specific hazards during fire fighting	:	Combustible. Development of hazardous combustion gases or vapours possible in the event of fire.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx) Sulphur oxides Oxides of phosphorus Hydrogen chloride gas

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Potassium oxides

Sodium oxides

Specific extinguishing methods	:	No data available
Further information	:	Use water spray to cool unopened containers. Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary. Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. Advice for emergency responders: For personal protection see section 8.
Environmental precautions	:	Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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Do not let product enter drains.

Methods and materials for containment and cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).
		Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

Advice on protection against fire and explosion	:	Use explosion-proof equipment.
		Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
Advice on safe handling	:	Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
		Work under hood. Do not inhale substance/mixture.
Conditions for safe storage	:	Keep container tightly closed in a dry and well-ventilated place.
		Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Further information on storage conditions	:	Keep locked up or in an area accessible only to qualified or authorised persons.
Storage class	:	3, Flammable liquids
Recommended storage temperature	:	-4 °F / -20 °C

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures : No data available

Personal protective equipment

Respiratory protection : Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter type P3

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Hand protection

Remarks : Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection : Tightly fitting safety goggles. Faceshield (8-inch minimum).
Use equipment for eye protection tested and approved under appropriate government standards

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such as NIOSH (US) or EN 166(EU).

Tightly fitting safety goggles

Skin and body protection	:	Complete suit protecting against chemicals Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. protective clothing
Hygiene measures	:	Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	solid
Color	:	No data available
Odor	:	No data available
Odor Threshold	:	No data available
pH	:	No data available
Melting point	:	No data available
Boiling point/boiling range	:	No data available
Flash point	:	No data available
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Flammability (liquids)	:	No data available
Burning rate	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available

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Relative vapour density	:	No data available
Relative density	:	No data available
Density	:	No data available
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	No data available
Flow time	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Particle characteristics Particle size	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.
Chemical stability	:	The product is chemically stable under standard ambient conditions (room temperature) .
Possibility of hazardous reactions	:	Violent reactions possible with: Strong oxidizing agents
Conditions to avoid	:	Heat, flames and sparks. no information available
Incompatible materials	:	No data available
Hazardous decomposition	:	In the event of fire: see section 5

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SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Mixture

Acute toxicity
Acute toxicity estimate Oral - 100 mg/kg
(Calculation method)
Acute toxicity estimate Oral - 414.31 mg/kg
(Calculation method)
Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
Acute toxicity estimate Inhalation - 4 h - 0.4105 mg/l - dust/mist(Calculation method)

Symptoms: Possible symptoms:, mucosal irritations
Acute toxicity estimate Dermal - 50.01 mg/kg
(Calculation method)
Acute toxicity estimate Dermal - 3,271 mg/kg
(Calculation method)

Skin corrosion/irritation
Remarks: Mixture causes skin irritation.

Serious eye damage/eye irritation
Remarks: Mixture causes serious eye damage.

Respiratory or skin sensitization
Mixture may cause allergy or asthma symptoms or breathing difficulties if inhaled. Mixture may cause an allergic skin reaction.

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

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11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Stomach - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

Kidney - Irregularities - Based on Human Evidence

Skin - Dermatitis - Based on Human Evidence

Central nervous system - Breathing difficulties - Based on Human Evidence

Heart - Irregularities - Based on Human Evidence

Components

Guanidine, N-methyl

Acute toxicity
LD50 Oral - Mouse - 680 mg/kg
Remarks: (RTECS)
The value is given in analogy to the following substances: Guanidine, 1-methyl-, hydrochloride
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: Causes skin irritation.
The value is given in analogy to the following substances: Guanidine, 1-methyl-, hydrochloride

Serious eye damage/eye irritation
Remarks: Causes serious eye irritation.
The value is given in analogy to the following substances: Guanidine, 1-methyl-, hydrochloride

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

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Aspiration hazard
No data available

4-ACETAMIDOBUTYRIC ACID

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: Causes serious eye irritation.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

pyridine-2-carboxylic acid

Acute toxicity
LD50 Oral - Rat - female - > 300 - < 2,000 mg/kg
(OECD Test Guideline 420)
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irreversible effects on the eye - 10 s

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(OECD Test Guideline 405)

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

pidolic acid

Acute toxicity
LD50 Oral - Rat - female - > 2,000 mg/kg
(OECD Test Guideline 420)
LD50 Inhalation - Rat - female - 4 h - > 5 mg/l - dust/mist
(OECD Test Guideline 403)
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Cattle
Result: Causes burns. - 4 h
(OECD Test Guideline 437)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: Not a skin sensitizer.
(OECD Test Guideline 429)

Germ cell mutagenicity
Test Type: gene mutation test
Test system: mouse lymphoma cells
Result: negative
Method: OECD Test Guideline 474
Species: Mouse - male and female

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Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

2-Hydroxy-2-methylpropionic acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: Causes skin irritation.

Serious eye damage/eye irritation
Remarks: Causes serious eye damage.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

3,3'-iminodi(propylamine)

Acute toxicity
LD50 Oral - Rat - 738 mg/kg
LC50 Inhalation - Rat - 4 h - 0.03 mg/l - dust/mist
LD50 Dermal - Rat - > 200 - < 400 mg/kg
No data available

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Skin corrosion/irritation
Skin - Rabbit
Result: Causes severe burns.
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive to eyes

Respiratory or skin sensitization
in vivo assay - Mouse
The product is a skin sensitiser, sub-category 1A.
(OECD Test Guideline 429)

Germ cell mutagenicity
Result: Not mutagenic in Ames Test

Result: Positive results were obtained in some in vivo tests.

Carcinogenicity
No data available

Reproductive toxicity
Did not show teratogenic effects in animal experiments.
Animal testing did not show any effects on fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.
- thymus

Aspiration hazard
No data available

3-Nitropropionic acid

Acute toxicity
LD50 Oral - Mouse - 68.1 mg/kg
Remarks: Behavioral:Ataxia.
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

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Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

L-Pipecolic acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation. - Respiratory system

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Triox

Acute toxicity
LD50 Oral - Rat - male and female - 766 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - male - 4 h - 8.58 mg/l - vapour
Remarks: (ECHA)

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Inhalation: Irritating to respiratory system.
LD50 Dermal - Rat - male and female - > 5,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - reconstructed human epidermis (RhE)
Result: No skin irritation - 3 - 60 min
(OECD Test Guideline 431)

Serious eye damage/eye irritation
Eyes - Bovine cornea
Result: No eye irritation - 4 h
(OECD Test Guideline 437)

Respiratory or skin sensitization
KeratinoSens assay - In vitro study
Result: negative
(OECD Test Guideline 442D)
Direct Peptide Reactivity Assay (DPRA) - In vitro study
Result: negative
(OECD Test Guideline 442C)

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Human lymphocytes
Result: negative
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

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1,3-diaminopropane

Acute toxicity
LD50 Oral - Rat - male - 311 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - 4 h - > 17.63 mg/l - vapour
(OECD Test Guideline 433)
LD50 Dermal - Rabbit - male - 178 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - In vitro study
Result: Causes burns.
(OECD Test Guideline 435)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irreversible effects on the eye
(OECD Test Guideline 405)
Remarks: Causes serious eye damage.

Respiratory or skin sensitization
Maximisation Test - Guinea pig
Result: positive
(OECD Test Guideline 406)
Remarks: The value is given in analogy to the following substances: ethylenediamine
Human experience - Human
Result: positive
Remarks: (ECHA)
The value is given in analogy to the following substances: ethylenediamine

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster lung cells
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

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succinic acid anhydride

Acute toxicity
LD50 Oral - Rat - male and female - 1,794.9 mg/kg
(OECD Test Guideline 401)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Inhalation: No data available
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - In vitro study
Result: Corrosive - 1 h
(OECD Test Guideline 431)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive - 18 - 24 h
(OECD Test Guideline 405)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Remarks: Risk of blindness!

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: positive
(OECD Test Guideline 429)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
May cause allergic respiratory and skin reactions Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Corrosive to the respiratory tract.
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

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Nicotinamide hypoxanthinedinucleotide sodium salt

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

L-4-hydroxyproline

Acute toxicity
LD50 Oral - Rat - male and female - > 16,000 mg/kg
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Skin - In vitro study
Result: No skin irritation
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
No data available

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Germ cell mutagenicity
Test Type: Ames test
Test system: S. typhimurium
Result: negative
Test Type: Micronucleus test
Test system: Human lymphocytes
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

O-Phosphoserine

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: Causes skin burns.
(ECHA)

Serious eye damage/eye irritation
Remarks: Causes serious eye damage.
(ECHA)

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

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Aspiration hazard
No data available

dopamine hydrochloride

Acute toxicity
LD50 Oral - Rat - 2,859 mg/kg
Remarks: (External MSDS)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitization
May cause allergic skin reaction.

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

L-Cysteinesulfinic Acid Monohydrate

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

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Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

pyridine-2,3-dicarboxylic acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling. Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

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3-Hydroxy-5-(hydroxymethyl)-2-methylisonicotinic acid

Acute toxicity
LD50 Oral - Rat - 7,500 mg/kg
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Theophylline

Acute toxicity
LD50 Oral - Rat - 225 mg/kg
Remarks: (RTECS)
LC50 Inhalation - Rat - male and female - 4 h - > 6.7 mg/l - aerosol
(OECD Test Guideline 403)
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

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(OECD Test Guideline 405)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)
Remarks: The value is given in analogy to the following substances: Caffeine

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Remarks: (ECHA)
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Result: negative
Species: Mouse - male and female - Red blood cells (erythrocytes)
Result: negative
Remarks: (ECHA)
Species: Rat - male - sperm
Result: negative
Remarks: (ECHA)
Species: Mouse - male - Bone marrow
Result: negative
Remarks: (ECHA)

Carcinogenicity
No data available

Reproductive toxicity
May damage the unborn child.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

2,6-Diaminopimelic acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

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Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

2-Aminoadipic acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

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(-)-Norepinephrine

Acute toxicity
LD50 Oral - 5.1 mg/kg
LC50 Inhalation - 4 h - 0.005 mg/l - dust/mist
LD50 Dermal - 51 mg/kg
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
Exposure during pregnancy can provoke uterine contractions which can result in fetal asphyxia.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

2,5-Dihydroxybenzoic acid

Acute toxicity
LD50 Oral - Rat - 800 mg/kg
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

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Germ cell mutagenicity
Test Type: Human
Test system: lymphocyte
Remarks: DNA inhibition

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

(2-Aminoethyl)phosphonic acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

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(-)-Tartaric acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

3,7-Dihydro-1,7-dimethyl-1H-purine-2,6-dione

Acute toxicity
LD50 Oral - Rat - female - 829.20 mg/kg
(OECD Test Guideline 423)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

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Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

3-Dehydroshikimic acid

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Remarks: Moderate eye irritation

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

1,2,3,4-Butanetetrol

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

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Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Trehalose

Acute toxicity
LD50 Oral - Rat - male and female - > 16,000 mg/kg
(OECD Test Guideline 401)
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitization
- Humans
Result: negative
Remarks: (ECHA)

Germ cell mutagenicity
No data available

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Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster fibroblasts
Result: negative
Method: OECD Test Guideline 475
Species: Mouse - male and female
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Caffeine

Acute toxicity
LD50 Oral - Rat - male and female - 367.7 mg/kg
(OECD Test Guideline 401)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)
LC50 Inhalation - Rat - male and female - 4 h - 4.94 mg/l - aerosol
(OECD Test Guideline 403)
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse

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Result: negative
(OECD Test Guideline 429)

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Result: negative
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Result: negative
Test Type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Result: negative
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster lung cells
Result: positive
Species: Mouse - male
Result: negative
Remarks: (ECHA)
Species: Mouse - male
Result: negative
Remarks: (ECHA)
Method: OECD Test Guideline 474
Species: Mouse - male and female - Red blood cells (erythrocytes)
Result: Positive results were obtained in some in vivo tests.
Species: Rat
Result: negative
Remarks: (ECHA)

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

4-ACETAMIDOBUTYRIC ACID:

Toxicity to fish : Remarks: No data available

pyridine-2-carboxylic acid:

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Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 202 GLP: yes
Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 13 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 201 GLP: yes NOEC (Pseudokirchneriella subcapitata (green algae)): 3.2 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 201 GLP: yes

Ecotoxicology Assessment

Chronic aquatic toxicity	:	This product has no known ecotoxicological effects.

pidolic acid:

Toxicity to fish	:	NOEC (Oncorhynchus mykiss (rainbow trout)): 100 mg/l Exposure time: 96 h Test Type: semi-static test Analytical monitoring: yes Method: OECD Test Guideline 203 GLP: yes
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 94.14 mg/l End point: Immobilization Exposure time: 48 h Test Type: semi-static test Analytical monitoring: yes Method: OECD Test Guideline 202 GLP: yes
Toxicity to algae/aquatic plants	:	NOEC (Raphidocelis subcapitata (freshwater green alga)): > 0.66 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 201

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GLP: yes

3,3'-iminodi(propylamine):

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 230 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 37.35 mg/l Exposure time: 48 h
Toxicity to algae/aquatic plants	:	EC50 (Desmodesmus subspicatus (green algae)): 599.2 mg/l Exposure time: 72 h

3-Nitropropionic acid:

Toxicity to fish	:	Remarks: No data available

Triox:

Toxicity to fish	:	LC50 (Oryzias latipes): > 100 mg/l End point: mortality Exposure time: 96 h Test Type: semi-static test Analytical monitoring: yes Method: OECD Test Guideline 203 GLP: yes
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 139.95 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Remarks: (ECHA)
Toxicity to algae/aquatic plants	:	ErC50 (Desmodesmus subspicatus (green algae)): 150 mg/l Exposure time: 72 h Test Type: static test Method: DIN 38412

1,3-diaminopropane:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): > 100 mg/l End point: mortality Exposure time: 96 h Test Type: static test Method: DIN 38412 part 15
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia (water flea)): 27 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test

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Method: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 175.1 mg/l
Exposure time: 72 h
Test Type: static test
Method: DIN 38412

NOEC (Desmodesmus subspicatus (green algae)): >= 500 mg/l
Exposure time: 72 h
Test Type: static test
Method: DIN 38412

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): >= 10 mg/l
End point: reproduction rate
Exposure time: 21 d
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 211
GLP: yes

Toxicity to microorganisms : EC50 (activated sludge): > 1,000 mg/l
Exposure time: 0.5 h
Test Type: static test
Method: OECD Test Guideline 209
GLP: yes

succinic acid anhydride:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 100 mg/l
End point: mortality
Exposure time: 96 h
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 203
GLP: yes

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 102 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201

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GLP: yes

NOEC (Pseudokirchneriella subcapitata (green algae)): 100 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

Toxicity to microorganisms : EC50 (activated sludge): > 300 mg/l
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209
GLP: yes

Nicotinamide hypoxanthinedinucleotide sodium salt:

Toxicity to fish : Remarks: No data available

L-4-hydroxyproline:

Toxicity to daphnia and other aquatic invertebrates : NOEC (Daphnia magna (Water flea)): 100 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes

EC50 (Daphnia magna (Water flea)): 100 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata): 71.6 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

NOEC (Pseudokirchneriella subcapitata): 25 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

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Toxicity to microorganisms	:	NOEC (activated sludge): > 100 mg/l Exposure time: 3 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 209 GLP: yes

O-Phosphoserine:

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l End point: mortality Exposure time: 48 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 202 GLP: yes
Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 201 GLP: yes

dopamine hydrochloride:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 2,200 - 4,600 mg/l Exposure time: 96 h Test Type: static test Method: DIN 38412 part 15

L-Cysteinesulfinic Acid Monohydrate:

Toxicity to fish	:	Remarks: No data available

pyridine-2,3-dicarboxylic acid:

Toxicity to fish	:	Remarks: No data available

3-Hydroxy-5-(hydroxymethyl)-2-methylisonicotinic acid:

Toxicity to fish	:	Remarks: No data available

Theophylline:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 100 mg/l Exposure time: 96 h Test Type: static test Method: DIN 38412 part 15
Toxicity to daphnia and	:	EC50 (Daphnia magna (Water flea)): 178 mg/l

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other aquatic invertebrates		Exposure time: 48 h Test Type: static test Method: Directive 67/548/EEC, Annex V, C.2.
Toxicity to algae/aquatic plants	:	ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Analytical monitoring: yes Method: OECD Test Guideline 201 GLP: yes
Toxicity to microorganisms	:	EC50 (activated sludge): > 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209 GLP: yes

(-)-Norepinephrine:

Toxicity to fish	:	Remarks: No data available

(2-Aminoethyl)phosphonic acid:

Toxicity to fish	:	Remarks: No data available

(-)-Tartaric acid:

Toxicity to fish	:	Remarks: No data available

1,2,3,4-Butanetetrol:

Toxicity to fish	:	Remarks: No data available

Trehalose:

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l End point: mortality Exposure time: 48 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 202 GLP: yes
Toxicity to algae/aquatic plants	:	ErC50 (Desmodesmus subspicatus (green algae)): 30.41 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Method: OECD Test Guideline 201 GLP: yes EC10 (Desmodesmus subspicatus (green algae)): 12.51 mg/l Exposure time: 72 h

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Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

Caffeine:

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): ca. 87 mg/l
End point: mortality
Exposure time: 96 h
Test Type: static test
Method: DIN 38412 part 15

NOEC (Leuciscus idus (Golden orfe)): 46 mg/l
End point: mortality
Exposure time: 96 h
Test Type: static test
Method: DIN 38412 part 15

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 182 mg/l
End point: mortality
Exposure time: 48 h
Test Type: static test
Method: DIN 38412

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

Toxicity to microorganisms : EC50 (activated sludge): > 1,000 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209
GLP: yes

Ecotoxicology Assessment

Chronic aquatic toxicity : This product has no known ecotoxicological effects.

Persistence and degradability

Components:

4-ACETAMIDOBUTYRIC ACID:

Biodegradability : Remarks: No data available

pyridine-2-carboxylic acid:

Biodegradability : aerobic
Inoculum: activated sludge, non-adapted

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Result: Readily biodegradable.
Biodegradation: 86 %
Exposure time: 28 d
Method: OECD Test Guideline 301B
GLP: yes

pidolic acid:

Biodegradability : aerobic
Inoculum: activated sludge, non-adapted
Concentration: 100 mg/l
Result: Readily biodegradable.
Biodegradation: 80.8 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
GLP: yes
Remarks: No data available

3,3'-iminodi(propylamine):

Biodegradability : Result: Readily biodegradable.
Biodegradation: 80 - 90 %
Exposure time: 28 d

3-Nitropropionic acid:

Biodegradability : Remarks: No data available

Triox:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 100 mg/l
Result: Readily biodegradable.
Biodegradation: 92 %
Exposure time: 14 d
Method: OECD Test Guideline 301C

1,3-diaminopropane:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 42 mg/l
Result: Readily biodegradable.
Biodegradation: 96 %
Exposure time: 14 d
Method: OECD Test Guideline 301A
GLP: yes

Biochemical Oxygen Demand (BOD) : 326 mg/g
Incubation time: 5 d
Remarks: (External MSDS)

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succinic acid anhydride:

Biodegradability : aerobic
Inoculum: activated sludge, non-adapted
Concentration: 20 mg/l
Result: Readily biodegradable.
Biodegradation: ca. 96.55 %
Exposure time: 28 d
Method: OECD Test Guideline 301E
GLP: yes

Nicotinamide hypoxanthinedinucleotide sodium salt:

Biodegradability : Remarks: No data available

L-4-hydroxyproline:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 500 mg/l
Theoretical oxygen demand
Result: Readily biodegradable.
Biodegradation: 18.2 %
Exposure time: 24 d
Remarks: (ECHA)

O-Phosphoserine:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 4.3 mg/l
Result: Not readily biodegradable.
Biodegradation: 43.5 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
GLP: yes
Remarks: The 10 day time window criterion is not fulfilled.

dopamine hydrochloride:

Biodegradability : aerobic
Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 60 - 70 %
Method: OECD Test Guideline 301B
Remarks: (External MSDS)

L-Cysteinesulfinic Acid Monohydrate:

Biodegradability : Remarks: No data available

pyridine-2,3-dicarboxylic acid:

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Biodegradability : Remarks: No data available

3-Hydroxy-5-(hydroxymethyl)-2-methylisonicotinic acid:

Biodegradability : Remarks: No data available

Theophylline:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 43 mg/l
Result: Readily biodegradable.
Biodegradation: > 90 - 100 %
Exposure time: 22 d
Method: OECD Test Guideline 301A
GLP: yes

(-)-Norepinephrine:

Biodegradability : Remarks: No data available

(2-Aminoethyl)phosphonic acid:

Biodegradability : Remarks: No data available

(-)-Tartaric acid:

Biodegradability : Remarks: No data available

1,2,3,4-Butanetetrol:

Biodegradability : Remarks: No data available

Trehalose:

Biodegradability : aerobic
Inoculum: activated sludge, non-adapted
Concentration: 100 mg/l
Biodegradation: 68 - 74 %
Exposure time: 28 d
Method: OECD Test Guideline 301A
Remarks: The 10 day time window criterion is not fulfilled.

Caffeine:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 43 mg/l
Result: Readily biodegradable.
Biodegradation: 90 - 100 %
Exposure time: 22 d
Method: OECD Test Guideline 301A
GLP: yes

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Bioaccumulative potential

Components:

pyridine-2-carboxylic acid:

Partition coefficient: n-octanol/water	:	log Pow: 0.72 Remarks: Bioaccumulation is not expected. (ECHA)

pidolic acid:

Bioaccumulation	:	Remarks: No data available
Partition coefficient: n-octanol/water	:	log Pow: ca. -1.23 (68 °F / 20 °C) Method: Regulation (EC) No. 440/2008, Annex, A.8 GLP: yes Remarks: Bioaccumulation is not expected.

2-Hydroxy-2-methylpropionic acid:

Partition coefficient: n-octanol/water	:	log Pow: -0.269

3,3'-iminodi(propylamine):

Bioaccumulation	:	Remarks: No data available
Partition coefficient: n-octanol/water	:	log Pow: -1.25 (77 °F / 25 °C)

3-Nitropropionic acid:

Bioaccumulation	:	Remarks: No data available

Triox:

Partition coefficient: n-octanol/water	:	log Pow: -2.79 (76.1 °F / 24.5 °C) pH: 5 - 6 Method: OECD Test Guideline 107 Remarks: Bioaccumulation is not expected.

1,3-diaminopropane:

Partition coefficient: n-octanol/water	:	log Pow: -1.05 (77 °F / 25 °C) Method: OECD Test Guideline 107 Remarks: Bioaccumulation is not expected.

succinic acid anhydride:

Partition coefficient: n-octanol/water	:	log Pow: 2.44 (104 °F / 40 °C) pH: 5.8 Method: OECD Test Guideline 117 Remarks: Bioaccumulation is not expected.

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Nicotinamide hypoxanthinedinucleotide sodium salt:

Bioaccumulation	:	Remarks: No data available

dopamine hydrochloride:

Bioaccumulation	:	Remarks: Bioaccumulation is unlikely.
Partition coefficient: n-octanol/water	:	log Pow: -2.58 (77 °F / 25 °C) Remarks: Bioaccumulation is not expected. (External MSDS)

L-Cysteinesulfinic Acid Monohydrate:

Bioaccumulation	:	Remarks: No data available

pyridine-2,3-dicarboxylic acid:

Bioaccumulation	:	Remarks: No data available
Partition coefficient: n-octanol/water	:	log Pow: 0.727 Remarks: The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

3-Hydroxy-5-(hydroxymethyl)-2-methylisonicotinic acid:

Bioaccumulation	:	Remarks: No data available

Theophylline:

Partition coefficient: n-octanol/water	:	log Pow: -0.008 (73 °F / 23 °C) Remarks: Bioaccumulation is not expected.

(-)-Norepinephrine:

Bioaccumulation	:	Remarks: No data available

(2-Aminoethyl)phosphonic acid:

Bioaccumulation	:	Remarks: No data available
Partition coefficient: n-octanol/water	:	log Pow: -1.382

(-)-Tartaric acid:

Bioaccumulation	:	Remarks: No data available

3-Dehydroshikimic acid:

Partition coefficient: n-octanol/water	:	log Pow: -1.931

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1,2,3,4-Butanetetrol:

Bioaccumulation	:	Remarks: No data available

Trehalose:

Bioaccumulation	:	Remarks: No data available
Partition coefficient: n-octanol/water	:	log Pow: < 0.3 (77 °F / 25 °C) pH: 6 - 7 Method: OECD Test Guideline 117 GLP: yes Remarks: Bioaccumulation is not expected.

Mobility in soil

Components:

pidolic acid:

Stability in soil	:	Remarks: No data available

3,3'-iminodi(propylamine):

Stability in soil	:	Remarks: No data available

3-Nitropropionic acid:

Stability in soil	:	Remarks: No data available

Nicotinamide hypoxanthinedinucleotide sodium salt:

Stability in soil	:	Remarks: No data available

L-Cysteinesulfinic Acid Monohydrate:

Stability in soil	:	Remarks: No data available

pyridine-2,3-dicarboxylic acid:

Stability in soil	:	Remarks: No data available

3-Hydroxy-5-(hydroxymethyl)-2-methylisonicotinic acid:

Stability in soil	:	Remarks: No data available

(-)-Norepinephrine:

Stability in soil	:	Remarks: No data available

(2-Aminoethyl)phosphonic acid:

Stability in soil	:	Remarks: No data available

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(-)-Tartaric acid:

Stability in soil : Remarks: No data available

1,2,3,4-Butanetetrol:

Stability in soil : Remarks: No data available

Trehalose:

Stability in soil : Remarks: No data available

Other adverse effects

Product:

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

Components:

4-ACETAMIDOBUTYRIC ACID:

Additional ecological information : No data available

pidolic acid:

Additional ecological information : No data available

2-Hydroxy-2-methylpropionic acid:

Additional ecological information : No data available

3,3'-iminodi(propylamine):

Additional ecological information : No data available

3-Nitropropionic acid:

Additional ecological information : No data available

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Nicotinamide hypoxanthinedinucleotide sodium salt:

Additional ecological information : No data available

L-Cysteinesulfinic Acid Monohydrate:

Additional ecological information : No data available

pyridine-2,3-dicarboxylic acid:

Additional ecological information : No data available

3-Hydroxy-5-(hydroxymethyl)-2-methylisonicotinic acid:

Additional ecological information : No data available

2-Aminoadipic acid:

Additional ecological information : No data available

(-)-Norepinephrine:

Additional ecological information : No data available

2,5-Dihydroxybenzoic acid:

Additional ecological information : Avoid release to the environment.
Do not empty into drains.

(2-Aminoethyl)phosphonic acid:

Additional ecological information : No data available

(-)-Tartaric acid:

Additional ecological information : No data available

1,2,3,4-Butanetetrol:

Additional ecological information : No data available

Trehalose:

Additional ecological information : No data available

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Caffeine:

Additional ecological information	:	Discharge into the environment must be avoided.

Endocrine disrupting properties

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Offer surplus and non-recyclable solutions to a licensed disposal company. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.
Contaminated packaging	:	Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	:	UN 2811
Proper shipping name	:	Toxic solid, organic, n.o.s. (1,3-diaminopropane)
Class	:	6.1
Packing group	:	II
Labels	:	Division 6.1 - Toxic substances
Packing instruction (cargo aircraft)	:	676
Packing instruction (passenger aircraft)	:	669

IMDG-Code

UN number	:	UN 2811
Proper shipping name	:	TOXIC SOLID, ORGANIC, N.O.S. (1,3-diaminopropane)

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Class	:	6.1
Packing group	:	II
Labels	:	6.1
EmS Code	:	F-A, S-A
Marine pollutant	:	no

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations

49 CFR

UN/ID/NA number	:	UN 2811
Proper shipping name	:	Toxic solids, organic, n.o.s. (1,3-diaminopropane)
Class	:	6.1
Packing group	:	II
Labels	:	Division 6.1 - Toxic substances
ERG Code	:	154
Marine pollutant	:	no
Poison Inhalation Hazard	:	No

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards	:	Acute Health Hazard Chronic Health Hazard
SARA 313	:	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

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This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307
This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations

Massachusetts Right To Know

1,3-diaminopropane	109-76-2
3-Nitropropionic acid	504-88-1
dulcite	608-66-2

Pennsylvania Right To Know

1,3-diaminopropane	109-76-2

Maine Chemicals of High Concern

dulcite	608-66-2

Vermont Chemicals of High Concern

dulcite	608-66-2

Washington Chemicals of High Concern

dulcite	608-66-2

The components of this product are reported in the following inventories:

US TSCA : Product contains substance(s) not active and not listed on TSCA inventory.

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN -

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Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

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